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THE AGE OF HORSES
— BY —
LOUIS BRANDT

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AN

INFALLIBLE GUIDE

TO DISCOVER

THE AGE OF HORSES.

BY

LOUIS BRANDT,

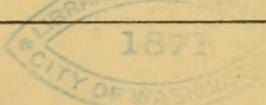
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VETERINARY SURGEON.

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256 INDIANOLA, TEXAS.

1860.



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B. S. B.
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PREFACE.

There are few persons, even among the veterinary surgeons, who are able to determine the exact age of a horse, after it has attained its eighth year, how much less then can it be expected that those should do so, who have neither anatomical nor physiological knowledge of that animal.

Horse-dealers are frequently accused of deceiving purchasers in the age of horses; now every horse-dealer must be desirous of retaining and increasing his good reputation, and would therefore not deceive others in this respect unless he were himself deceived.

The purpose of this book is, entirely to set aside this deception and to enable all, both sellers and buyers (even those who never before knew anything about the age of a horse) by a careful perusal of its contents, to discover for themselves with unerring accuracy the age of any horse.

This book is published in convenient form, so that it may be carried in the pocket, as it would be difficult for a person, who was going to purchase a horse, and who had perhaps never before taken any interest

in horses, to remember all the rules given in this book after one perusal.

The author who has theoretically and practically studied as veterinary surgeon, has had opportunities of examining thousands of stud-horses of various ages thus thoroughly convincing himself of the reliability of the rules he has laid down for the discovery of the age of a horse.

The value of that most beautiful and useful animal, differs much at different ages, and as its age is so frequently mistaken, it is necessary that the public should possess a sure guide by which its may be ascertained.

This is the purpose of

THE AUTHOR.

September 1860.

Introduction.

THE age of horses can only be ascertained with any degree of exactness, by the teeth; particularly by the incisors.

The only reliable and positive proof of the age of horses being the successive changes which take place during a succession of years, it becomes absolutely necessary that one should make oneself thoroughly acquainted with these changes, viz: form, attrition, etc., etc.

The following description and drawings will enable every individual without exception, to ascertain easily and accurately the age of a horse.

A foal is born without incisors, but has 12 back teeth, 3 pair in each jaw, which have at least forced their points through the gums. In the course of 14 days after birth 4 nippers appear, in 6 weeks the middle teeth, and in the course of 8 months the 4 corner teeth; so that in 9 months it has 24 teeth in the upper and lower jaws. These are called foal-teeth, and are all changed by their 5th or 6th year; those succeeding them are called horse-teeth.

The back teeth appear in the following order: the 4 front pair, as before stated, appear at birth and are afterwards changed. The 4th double pair (the first which remain stationary) appear after the 9th month, and are sure to be found in every foal of a year old. The 5th four appear in the second, sometimes not until the third year, and the 5th usually in the fourth, frequently not until the fifth year. All these three

pairs of back double teeth remain unchanged, as do also the four hook-teeth which as to the time of their appearance are the most uncertain of all. They appear sometimes at the end of the third year, sometimes in the middle or at the end of the fourth, often in the middle and less frequently at the end of the fifth, but sometimes not until the beginning of the sixth year. The back and hook teeth need not be very minutely described as they are of little use in ascertaining the age; but the incisors on the contrary deserve great attention on this account.

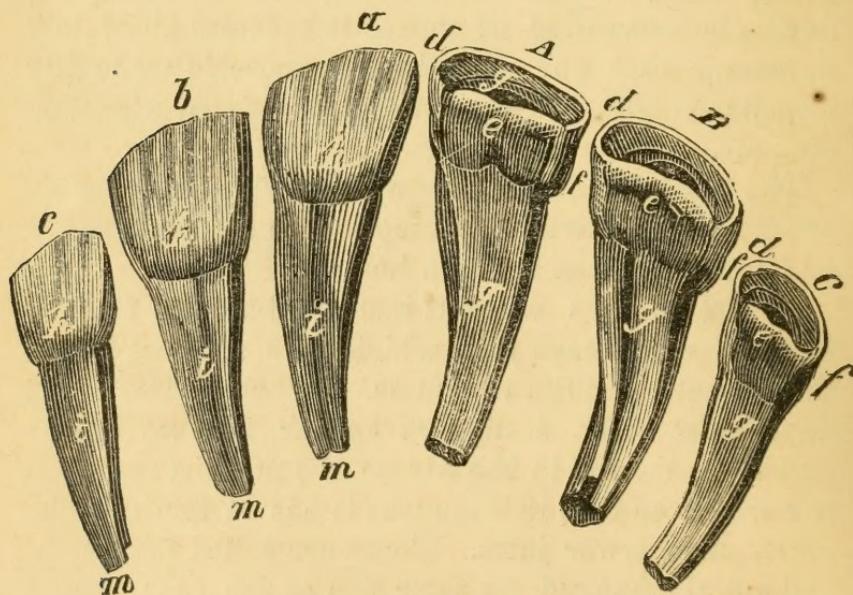


Fig. 1.

Fig. 1 shews the right side of the milk incisors of the lower jaw, in their natural size and fully developed.

- a*, The nippers;
- b*, The middle tooth;
- c*, The corner tooth.

The surface is represented arched on the exterior. (*h*) Shews the contracted body of the tooth. (*i*) The narrow arched neck. (*m*) The root.

A, B, C, shew the concave side of these teeth towards the hollow of the mouth. The mark is enclosed within the outeredge *d A f, d B f, d C f*, and the inner somewhat lower one *d e f*.

(g) Shews the hollow inside surface of the body of the tooth.

The incisors of the foal differ from those of the horse : 1stly by their regular conical formation, 2ndly almost in the centre of their body a narrow contraction is visible, which is called the neck ; this is entirely wanting in the horse teeth, 3rdly at their full growth they are smaller than horse teeth. The full length of the milk teeth is about half that of horse teeth ; this cannot however be perceived in live horses. The exact breadth is also not to be depended upon, because the milk teeth of large foals appear almost as broad as those of small horses. If the nippers are horse teeth they will form a great contrast with the middle and corner teeth, whose size will at once betray them as milk teeth, especially the corner teeth, if the middle ones have changed. 4thly the outer surface of the foal teeth are smooth and striped with brown ; but on horse teeth the same surface is divided by a dirty yellow indentation, inclining towards the centre, which is sometimes double on the upper teeth. The last two signs of distinction are alone sufficient to prevent any one from mistaking a foal for a horse tooth.



Of the Formation of the Incisors.

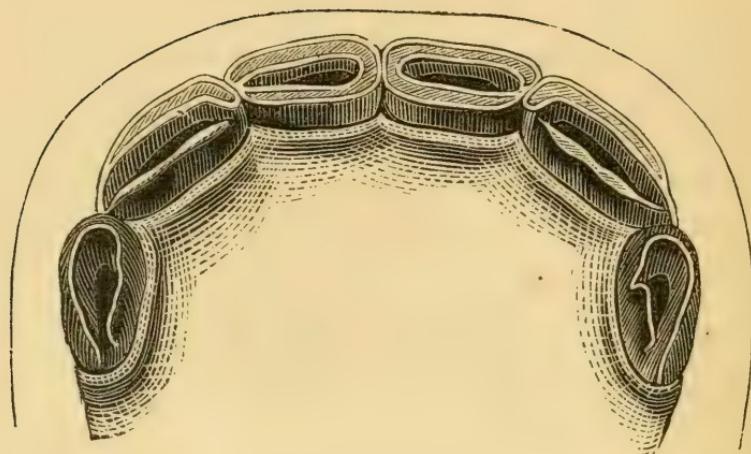
In order to become fully acquainted with the form of the incisors, one must accurately examine those taken from the jaw bones of dead horses of various ages. On every incisor may be observed. 1st A grinder which visibly protudes with each tooth out of its cavity above the gum, and which commences in a funnel shaped cavity, and ends in a smooth even surface. 2nd A substance which is partly exposed, and partly hidden by the gum and in the cavity of the tooth. 3rd A root end with which each tooth sinks into its cavity. The foal as well as the horse-teeth suffer a slow and continual waste of tooth-substance, from chewing and biting with their grinders, by which means not only the form of the grinder is changed from year to year but the length of the teeth is constantly decreasing, and that frequently quite evenly and regularly, so that in the course of time, at a very advanced age they will sometimes not exceed half an inch in length while in youth they were $2\frac{1}{2}$ —3 inches long.

The breadth and length of the teeth decrease in time in the same proportions.

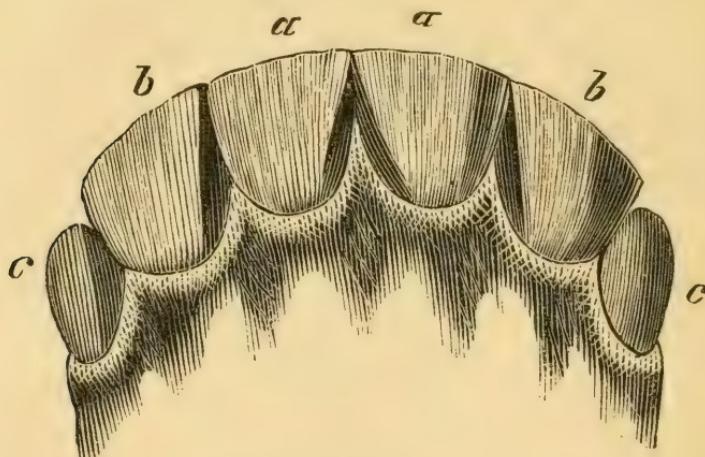
The thickness as well as the breadth of the foal-teeth is constantly decreasing, from the grinder to the end of the root; the contrary is the case with the horse-teeth.

The form of the foal incisors may be thus classified: 1st The grater or grinder. 2nd Its external surface, outwardly arched towards the lips. 3rd An inward surface arched towards the hollow of the mouth. The two last mentioned pass together into the root of the tooth. The grinder which has not been used, of every foal or horse,

has the form of an egg, and is three times as broad as it is thick, hollowed out in the shape of a funnel, and is supplied with two sharp edges, which surround the socket. We will call this socket "the mark." In the centre of this mark a kernel may be observed, which forms a tube commencing at the end of the root, for the reception of the nerves and vessels; this must not be confounded with the mark of the tooth, which is entirely different; the mark being the outer, and the cavity the inner hole, and which is found in every young tooth not yet worn down to the kernel, which tooth consists merely of an enameled shell, filled during the life time of the animal with a thickish fluid, which by degrees becomes a grey matter. This fluid enters the lower incisors, upon an average to the depth of 4, and in the upper ones 8 lines, and is entirely separated from the beforenamed inner socket, by means of an enameled funnel-shaped shell of its own. One of the outer edges forms at the same time the basis of the outer surface, and one of the interior, that of the inner surface. The outer edge of each tooth, always rises one or two lines above the inner one, so that when the newly formed upper and lower incisors are first used, and grated together, the outer edges alone touch for a considerable time. The inner edges do not come into contact, until the outer ones are worn down to an equal height with them, which for the horse-teeth generally requires a whole year.

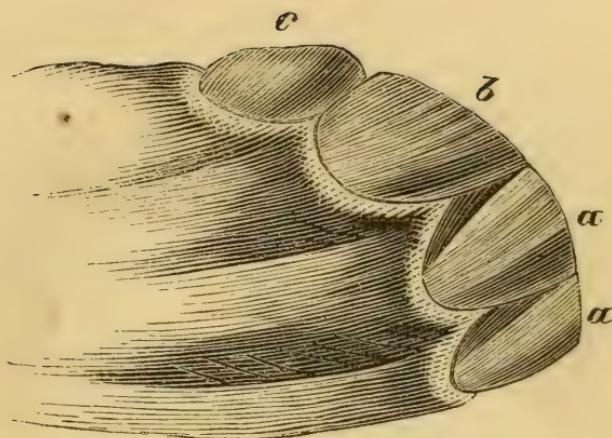
Fig. 2. $\frac{1}{2}$ year.

Represents the lower jaw of a half year old foal. By observing the inside, it will be perceived that, both the outer and inner edge of the nipper are worn, but of the middle teeth only the outer edge, while the corner teeth have not yet come into contact.

Fig. 3. $\frac{1}{2}$ year.

Is the representation of the outer side of the jaw of a half year old foal.

- a, a) The Nippers;
- b, b) The Middle teeth;
- c, c) The Corner teeth.

Fig. 4. $\frac{1}{2}$ year

Is a side view of the jaw of a half year old foal.

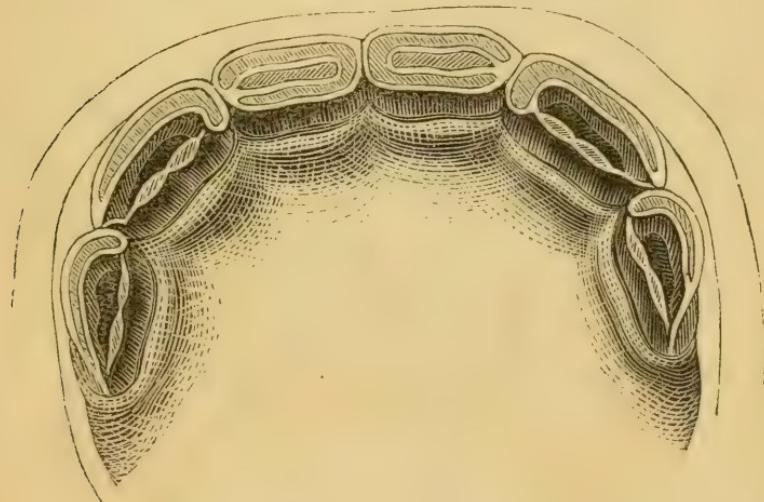


Fig. 5. 1 year.

Shews the lower jaw at a year old; where the edges of all the incisors are partly worn by friction, and the inner edge of the corner teeth alone remain uninjured.

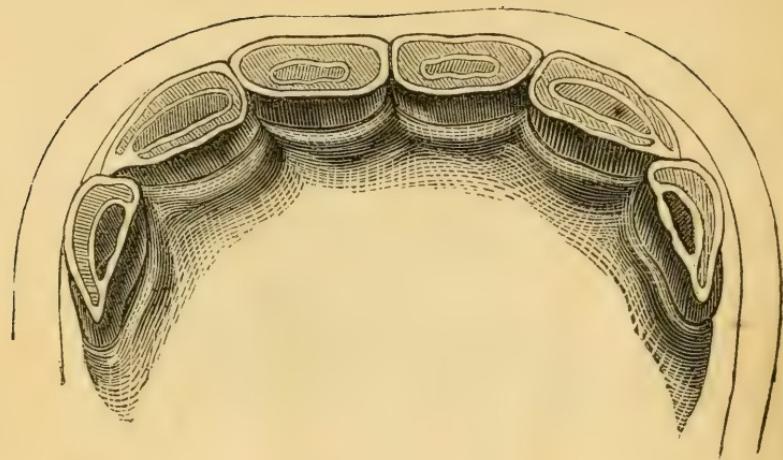


Fig. 6. 2 years.

Is the lower jaw at 2 years old, in which the edges of the nippers and middle teeth, and their mark are worn down, and the inner edge of the corner tooth is also brought into requisition.

At the age of $2\frac{1}{2}$ years the teeth begin to change, and those which then appear are called permanent, or rather Horse-teeth.

A Description of the Horse-teeth.

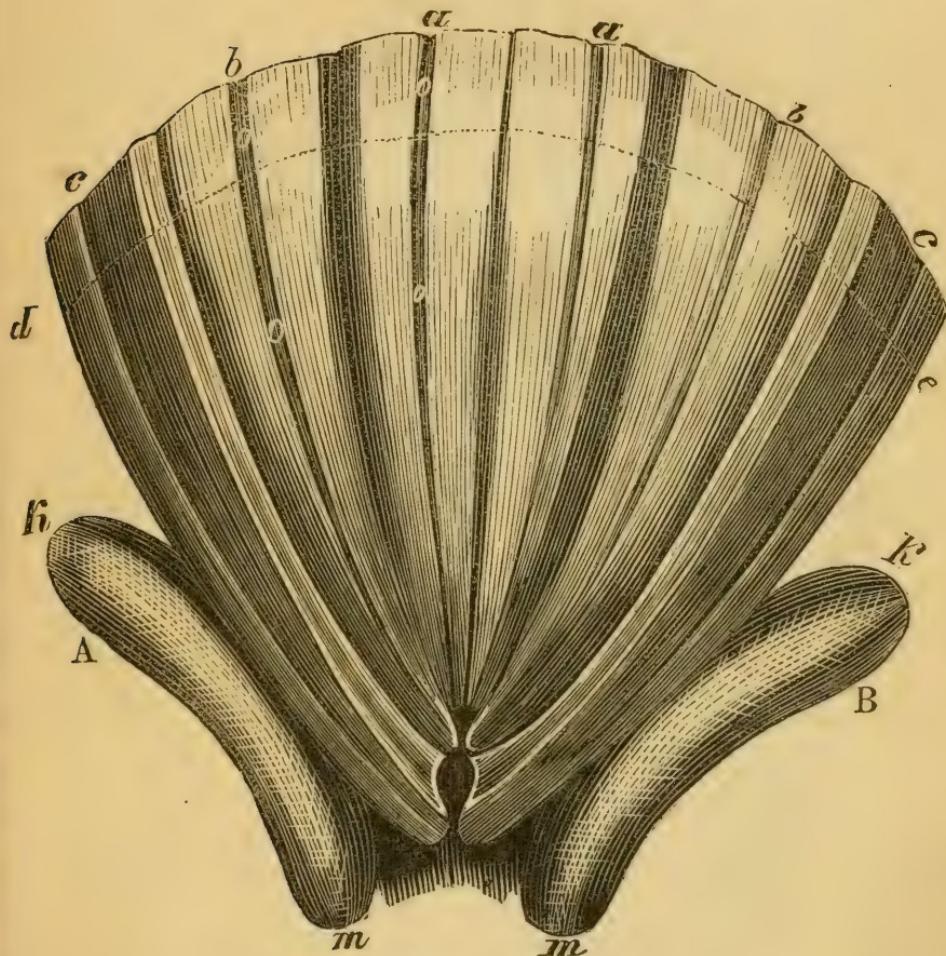


Fig. 7. A.

Represents the appearance of the horse-incisors in their respective places in the lower jaw, with their outer surface arched towards the distant bony blade of the socket.

- a, a)* The two Nippers;
- b, b)* The middle teeth;
- c, c)* The corner teeth;
- k, k)* The Hooks;
- e, d)* Is the cavity in the outer partition of the mark;

o, o) Shews the furrows which distinguish the Horse-teeth;

m m) The root of the Hooks.

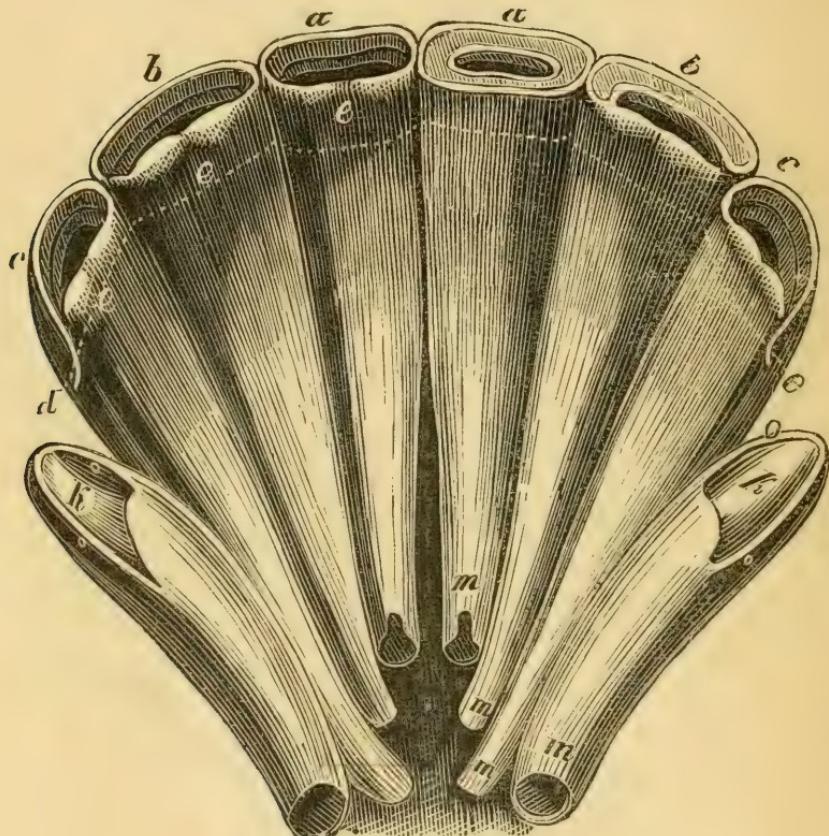


Fig. 7. B

Shews the incisors of the horse on the lower jaw, from the inside of the mouth, in their position towards the distant jaw bone, in which they are usually enclosed.

a a) The nippers, on the right side of which the attrition of the outer and upper edge is visible, where they come into contact with the edge of the left side.

b b) The two middle teeth the right side of the outer edge of which is beginning to be worn, while the inner side is still uninjured.

d & e) The dotted lines shew the crown of the tooth projecting beyond the gum.

- k k)* Are the hooks about to break through.
m, m, m, m) Are the roots of the teeth not yet filled out with the bony substance.

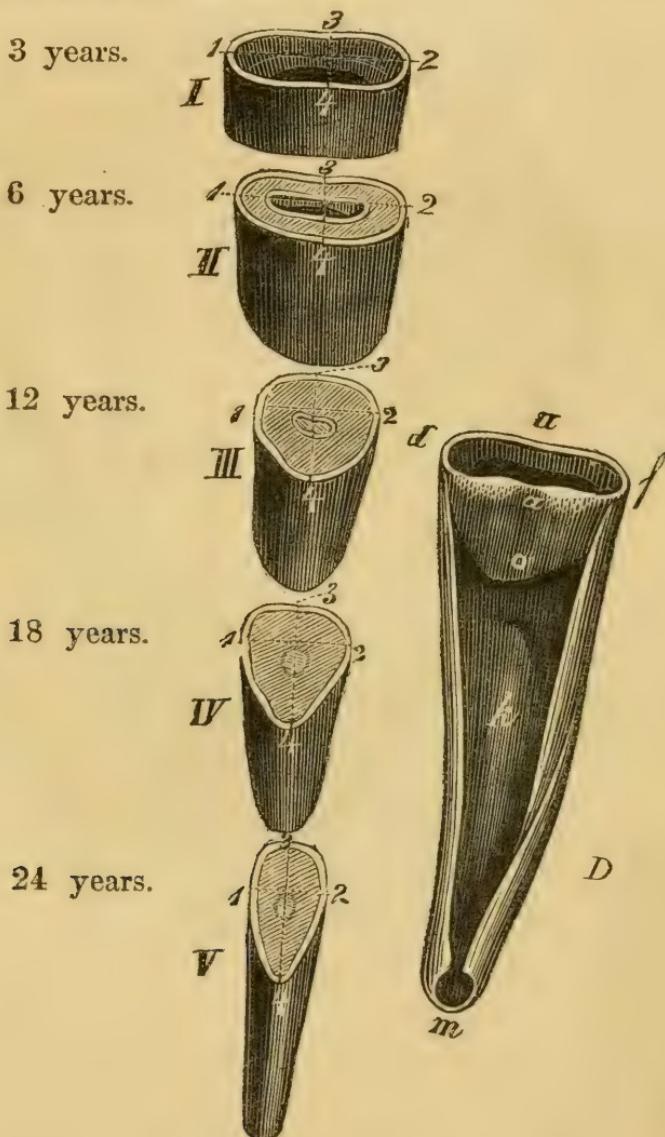


Fig. 8. A.

Shews a nipper after the probable friction caused by the cutting of the horse incisor.

I. Shews it breaking through afresh at the age of 3 years. 1 & 2 Is its breadth. 3 & 4 its thickness.

II. Represents the friction surface as it appears at the age of 6 years (the crown cut off $\frac{1}{4}$ inch) where the breadth (1 & 2) begins to decrease, and the thickness (3 & 4) takes the form of an egg.

III. This section shews a rounder friction surface of 12 years old, in which the breadth and thickness become proportionate.

IV. A triangular friction surface of 18 years.

V. Is a friction surface of 24 years in which the breadth (1 & 2) measures but half as much as the thickness (3 & 4).

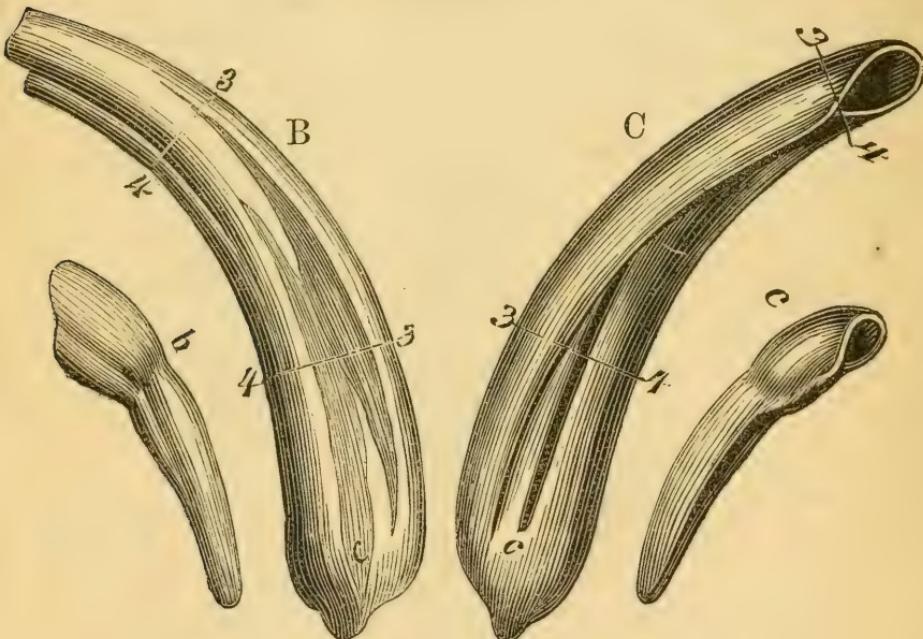


Fig. 8. B, C.

Shews a horse-incisor, viewed from the side in which the root.

c, e) Is twice as thick as the upper end;

b and *c*) Shew two foal-teeth, raised out of the socket, and viewed from the side.

Fig. 8. D.
[See page 15.]

Is an Incisor split length-wise, of a full grown horse.

d, a, f) Is the outer raised edge.

a, o) The funnel shaped cavity of the tooth.

k) The hollow body.

m) The still unfilled root of the tooth.

A full grown stallion and gelding has 40 and a mare 36 real teeth, the former have 4 hook-teeth which are wanting in the latter, although sometimes in place of the hooks small stumps similar to teeth are found. The so-called Wolfes-teeth which in some young horses are found next to the first double teeth are not included in this number; because they are not real teeth, they appear only in youth, frequently do not break through the gums at all, and usually disappear again, in 8 or 9 years.

24 of the real teeth in either sex, are seated in the upper part of the mouth, viz above the lips. 12 in each check bone, and 6 on each side.

They are divided into 6 double pairs, counting from below, upwards, so that those situated next to the incisors in all the 4 rows are 1st. Their neighbors 2nd and so forth 3rd, 4th and 5th, and the last pair (which are called back teeth) are the 6th.

12 others are seated in the lower part of the mouth, surrounded by the lips, 6 in the upper, and 6 in the lower jaw, all of which are covered by the lips, and stand in a row, in the form of an arch, occupying the entrance of the hollow of the mouth. These are called Incisors. The 4 innermost (2 in each jaw) are called Nippers, the outer 4 in both jaws, the corner teeth and the 4 seated between the nippers and the corner teeth, are called the middle teeth. Each back tooth, and incisor in both rows of the under-jaw, comes into contact and rubs against the back tooth and incisor of the same name in each row of the upper jaw. The teeth of the

latter are however all broader and thicker than those of the former.

The 4 Hooks are seated alone, over each corner tooth, nearer to the same on the lower, than on the upper jaw, but so that they never come in contact with each other, like the back teeth and incisors.

The whole number of teeth does not become complete and perfect, until the horse has attained the age of $4\frac{1}{2}$ or 5 years. Before this time the younger it is, the fewer of them it has in its mouth, and those which it has do not all remain.

The form of a permanent incisor may be thus described. The more it loses in length by friction, the more it also loses in width, so that the nearer the friction surface approaches to the end of the root, the narrower and thicker it must appear.

Fig. 8. A.

[See page 15.]

Shews most accurately and minutely, how the friction surface changes by friction.

Fig. 7. A, k, k, and Fig. 7. B, k, k.

[See page 13.]

Shew the form of a Hook tooth.

The form of every new hook tooth resembles a cylinder, in the shape of a hook, with a conical projecting grinder, which is surrounded by a spoon-shaped edge, turned towards the hollow of the mouth, so that the cone cannot be seen from the outside, and the whole grinder has the appearance of the back side of the bowl of a spoon.

The edge surrounds the half inch long cone, like a screen, but so that two deep furrows remain between the two.

With the exception of this grinder, the rest of the body is uniformly round and if one is cut through, the surface will be found to be almost even.

As the hook teeth afford no reliable guide to the age of a horse, a minute description of them is needless.

We have now shown in what manner the exact age of a foal can be ascertained until it reaches the age of two years.

The following will explain how the age of a horse (which generally speaking does not average over 30 years) can with certainty be ascertained.

We will take the teeth of horses of a medium size as a stand-point, and from the rules laid down for these, we can calculate the age under other circumstances.

Large horses it is evident have larger teeth than small ones, but the age of both can be ascertained by the same rule as that laid down for those of medium size.

As we stated before, the incisors afford the safest guide to the knowledge of the age of a horse. The length of the tooth of a horse of medium size is, 3 inches or 36 lines. After the newly changed tooth has arrived at its proper length, *it shoots up a line regularly every year*, and if the teeth stand rightly, *the grinder wears off a line every year*.

Should the teeth (which is the case with many horses) stand too far forwards, they do not wear down in the same proportion as they shoot upwards; we therefore see horses with very long teeth. This is however no hindrance in ascertaining the age. We will treat of this more elaborately anon.

At the age of 5 years, the corner teeth of the lower jaw have grown up to 5 lines above the gum, each middle tooth 7, and each nipper 9.

At 8 years of age, and older, each corner tooth of the same horse projects only 4, the middle teeth 6, and the nippers 8 lines above the gums. This is very important, in fact necessary to be known, because, it is the only means, by which one can decide with certainty upon the age of a horse, whose teeth at an advanced age have become longer than they would have done by proper wear.

We will now first describe to the reader in what manner the age of a horse can be ascertained by those teeth which wear down just in the same proportion as they shoot upwards, and consequently retain their proper height above the gum.

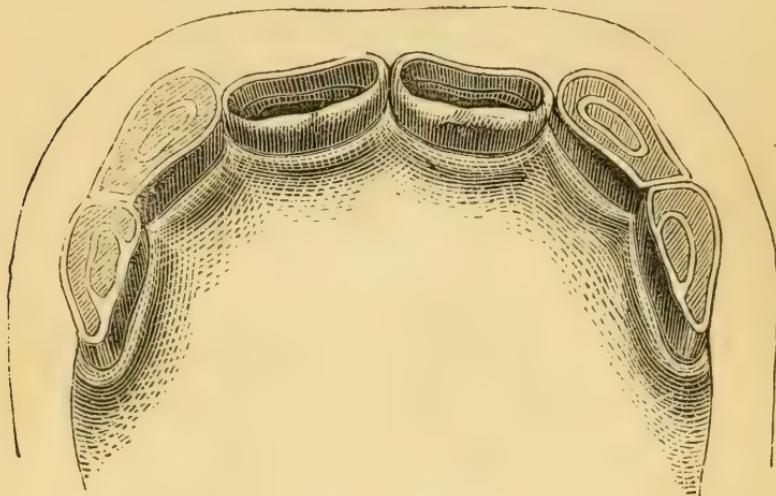


Fig. 9. 2½ years.

The lower jaw at 2½ years old, in which the two nippers will be perceived to be breaking through afresh as horse teeth, and the foal teeth appear as a smooth friction surface.

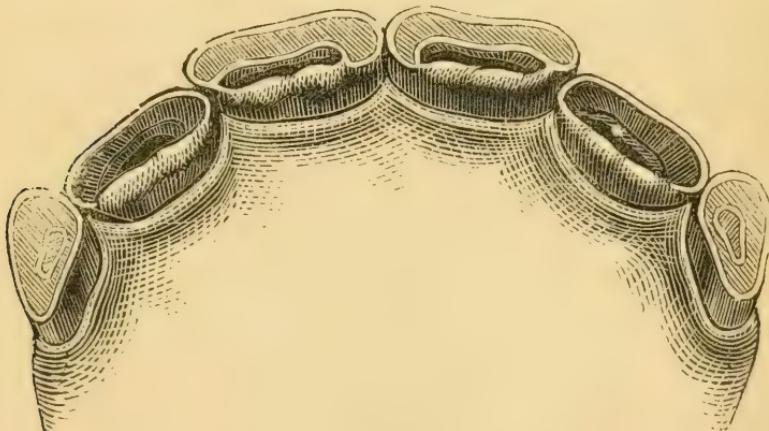


Fig. 10. 3½ years.

Represents the lower jaw at 3½ years of age. The

middle teeth are just breaking through, the outer edge of the nippers is already worn down and the corner teeth blunted.

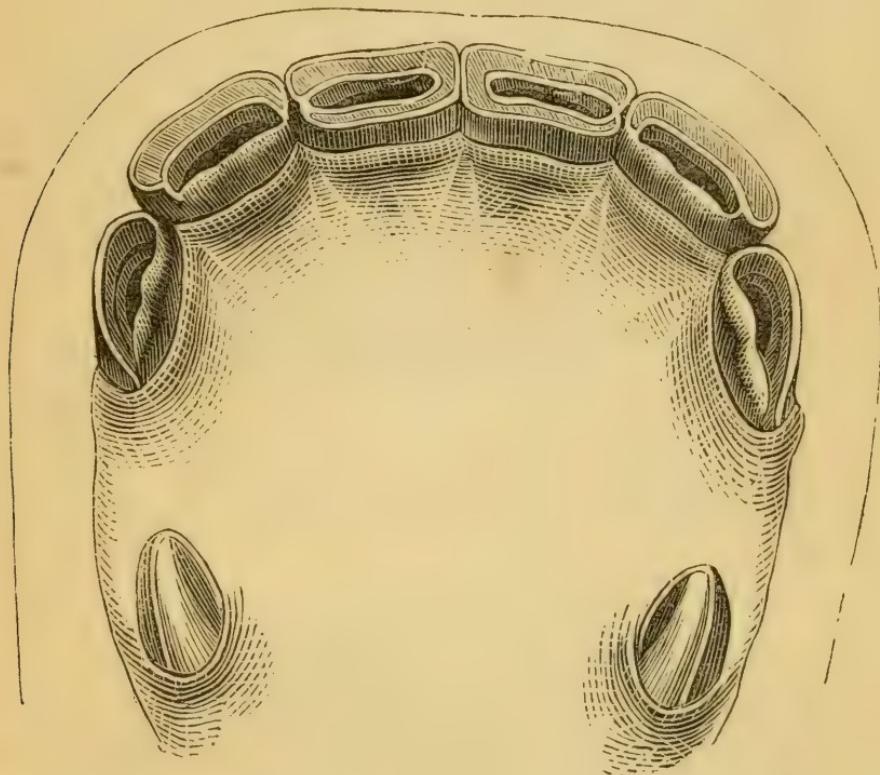


Fig. 11. 4½ years.

The lower jaw at $4\frac{1}{2}$ years old. One may perceive the corner teeth and hooks breaking through, the middle teeth worn only on the outer edge, and the nippers worn down at both edges.

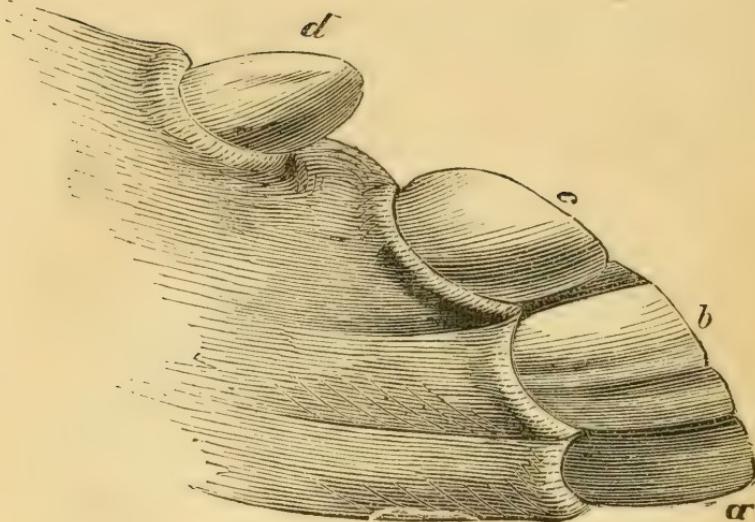


Fig. 12. 5 years.

Is an outside and side view of the lower jaw at 5 years of age.

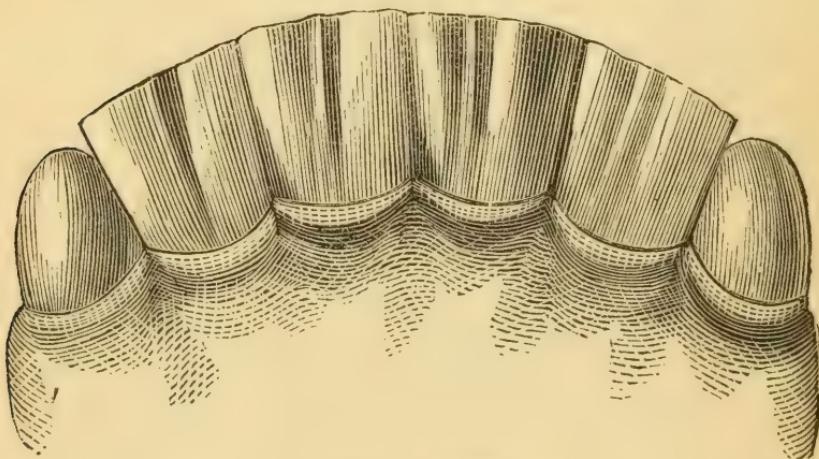


Fig. 13. 5 years.

Shews a side view of a lower jaw at 5 years.

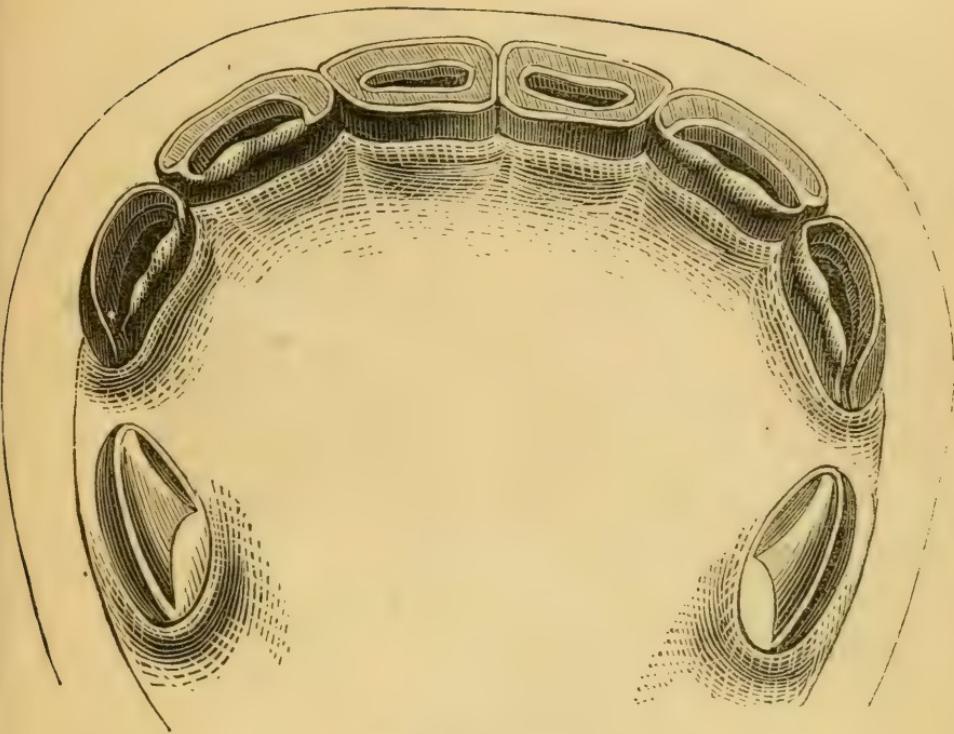


Fig. 14. 5 years.

Shews a lower jaw at 5 years of age in which *both edges* of the nippers are worn down, almost to the extinction of the mark, the middle teeth only on the outer edge, and the corner ones after having attained the same height as the others, have also come into wear. The hooks are full grown, but are not worn away in the least.

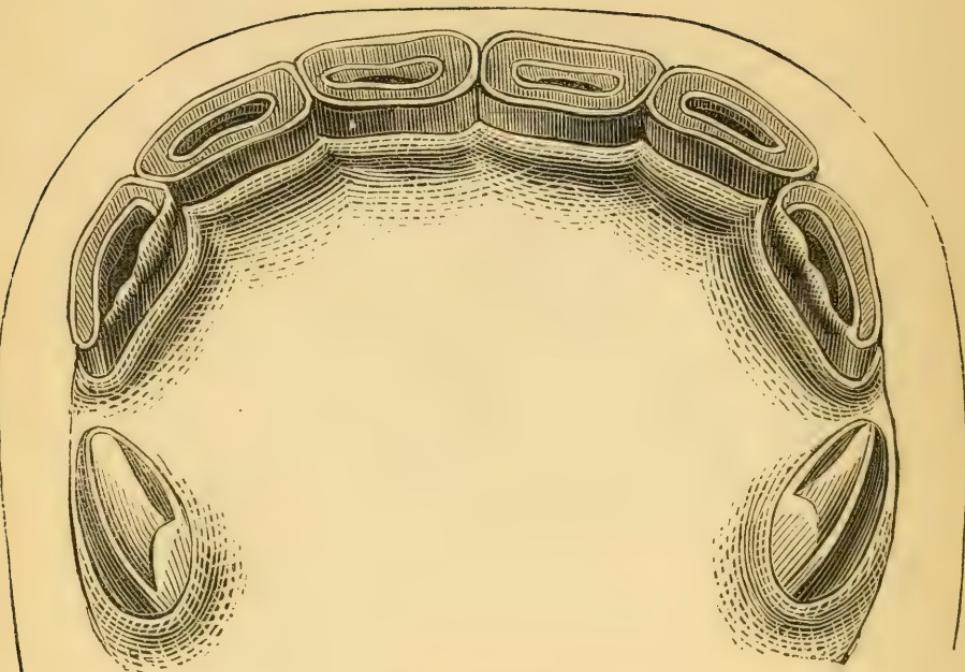


Fig. 15. 6 years.

At 6 years of age one perceives the nippers worn down even with the middle teeth, in the lower jaw, which teeth have still a cavity, and the inner edge of the corner tooth has worn down, even with the outer one.

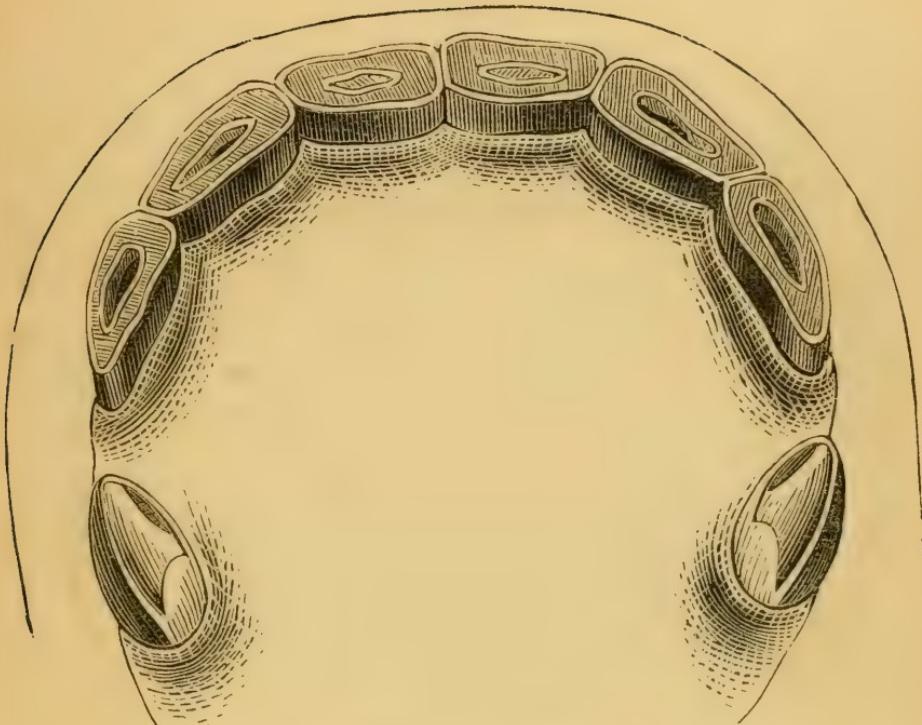


Fig. 16. 7 years.

At 7 years the middle teeth in the lower jaw have become even, both edges of the corner teeth rub, and have still a small cavity. The hooks have lost more of their edges, and their pointed ends have become more rounded. The hooks as we have stated before, in discovering the age of a horse, are not to be relied on, great care is therefore necessary in consulting them, and the signs they present can only be considered useful, when they agree with those of the other teeth; otherwise no dependence at all, can be placed upon them.

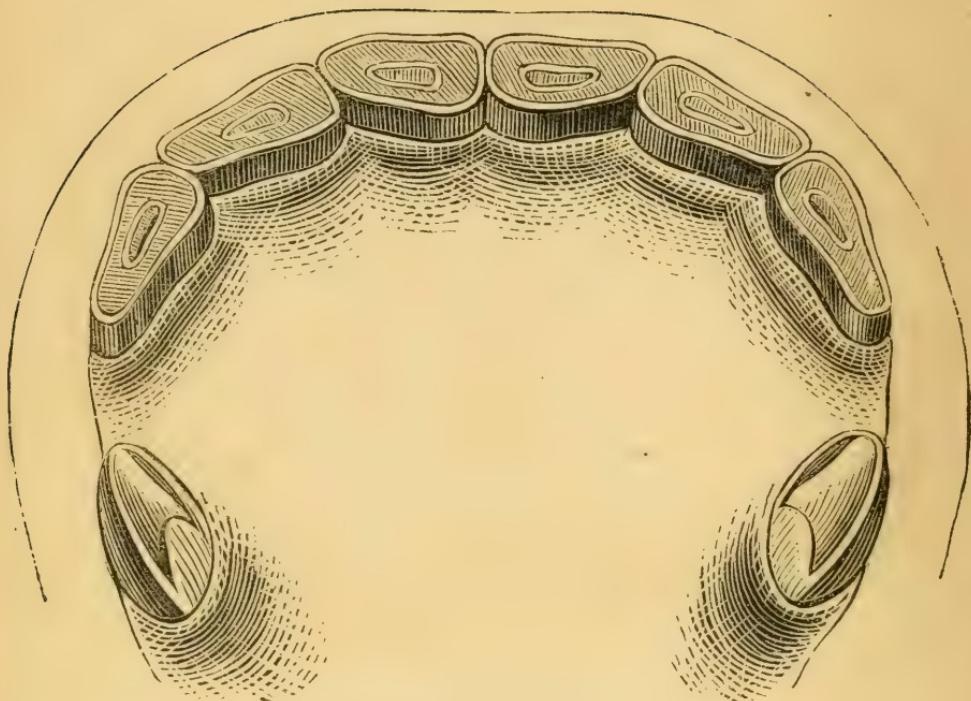


Fig. 17. 8 years.

Is a lower jaw at 8 years of age, in which the incisors have all become equally worn, and in the corner tooth merely a trace of the disappearing mark is visible. The edges of the hooks are worn down, almost to half their height.

As we previously observed, the marks in the upper teeth are as deep again as those in the under ones, and consequently wear as long again.

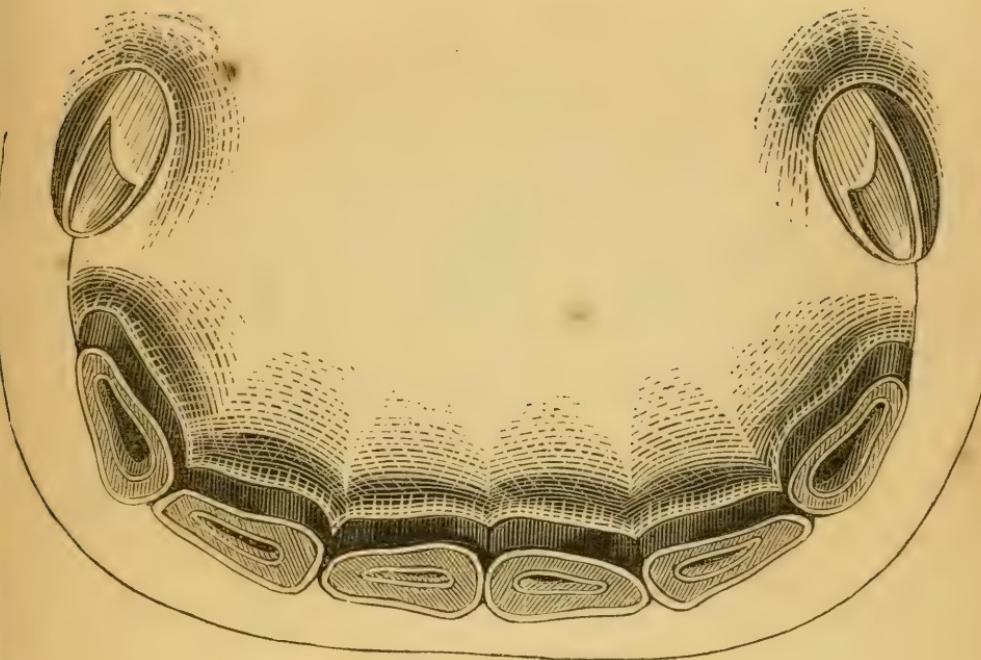


Fig. 18. 9 years.

Represents the upper jaw at 9 years old. It will be perceived that the marks of the nippers have almost disappeared; the middle teeth still shew a small mark; the mark in the corner teeth is still deeper; the inner edge is also worn down, whereby, the upper jaw at 9 years of age, can be distinguished, from the lower one at 6 years.

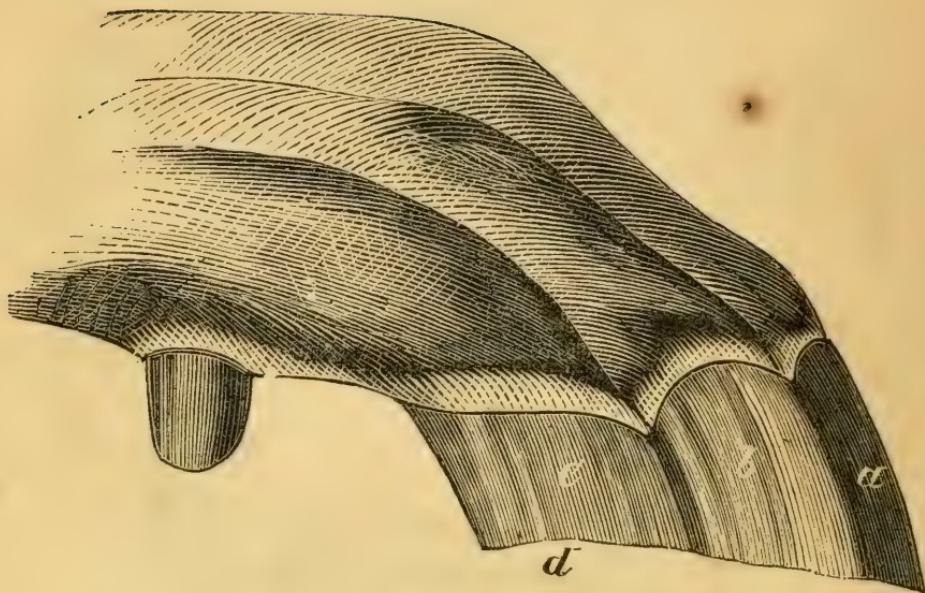


Fig. 19. 9 years.

Shews a side view of the upper jaw at 9 years of age, in which the incision which is usually found in the corner tooth (*d*) may be observed.

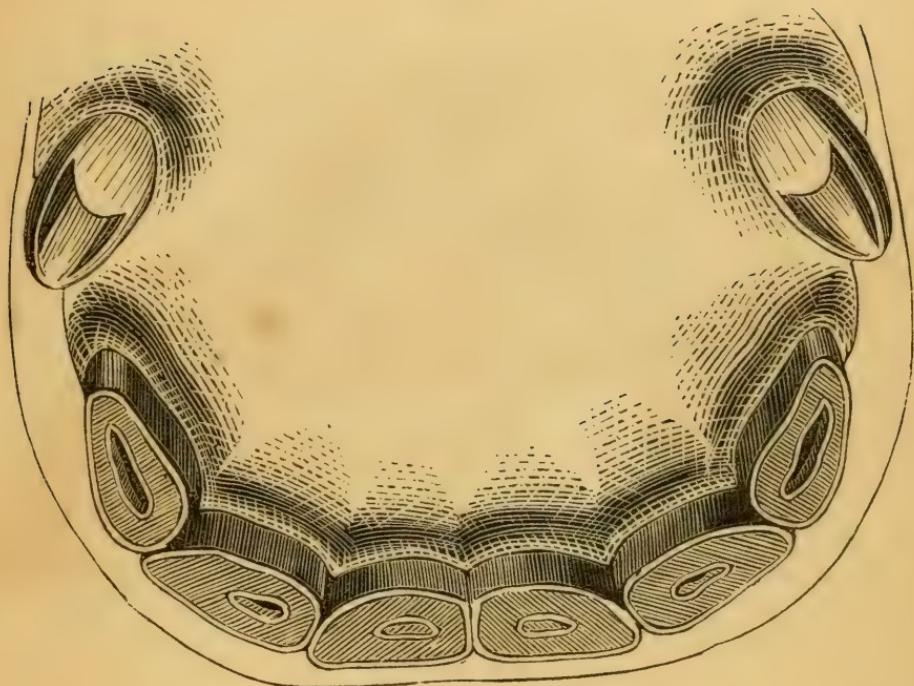


Fig. 20. 10 years.

Is an upper jaw at 10 years of age, when the mark of the middle teeth is worn down.

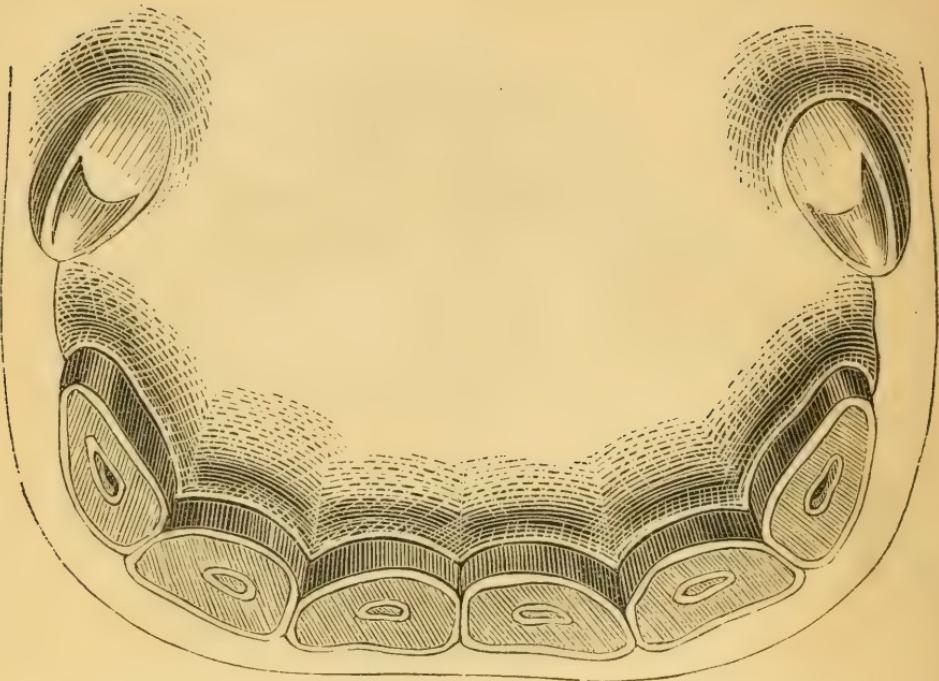


Fig. 21. 11 years.

Is the upper jaw at 11 years old, where the mark of the corner teeth is worn down.

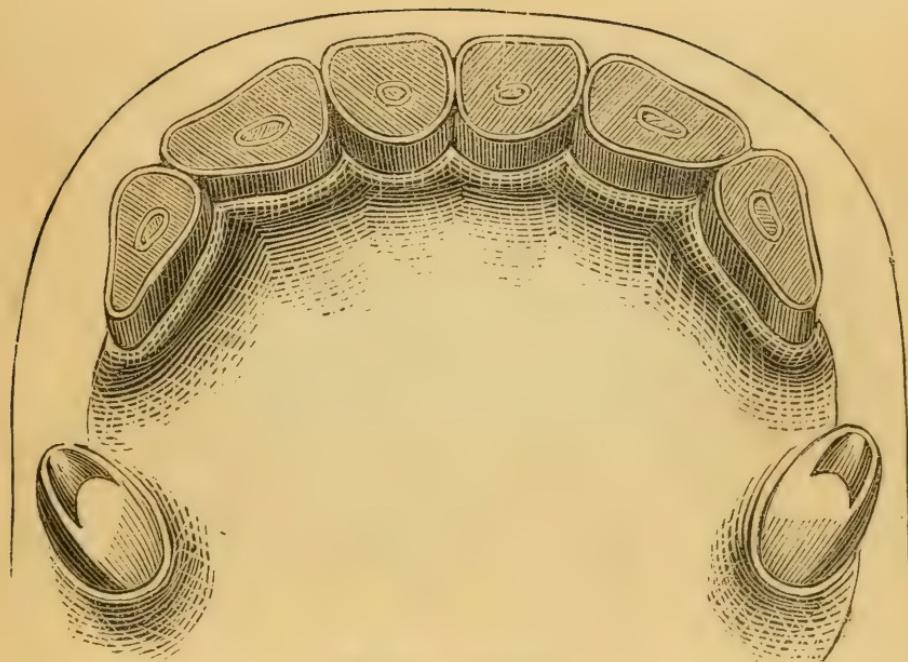


Fig. 22. 12 years.

At 12 years of age the nippers in the lower jaw are as thick as they are broad, they have become round. The middle teeth are becoming round, and the corner ones increase in thickness.

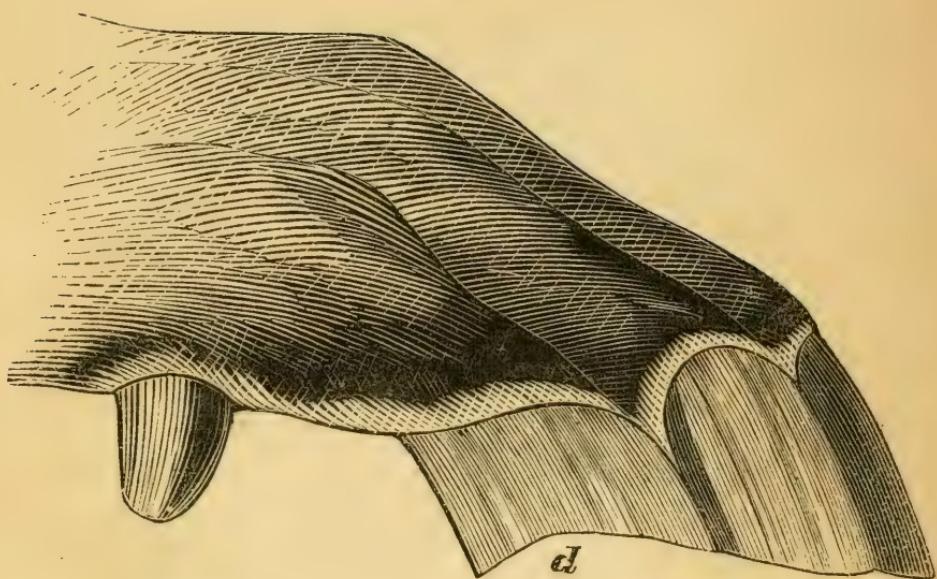


Fig. 23. 12 years.

A side view of the upper jaw at 12 years of age shews the increased size of the incision (*d*) in the corner tooth.

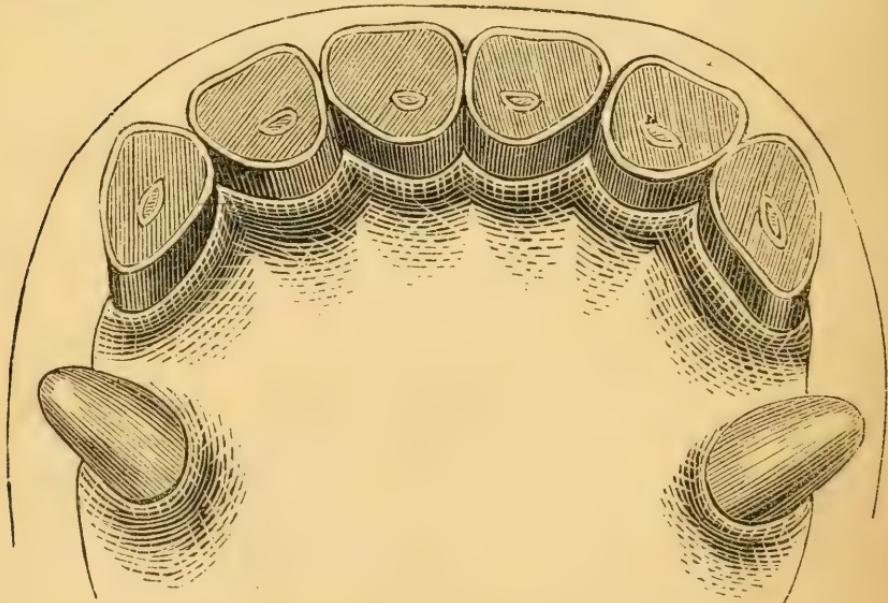


Fig. 24 13 years.

Represents a lower jaw at 13 years of age, in which the nippers and middle teeth, have become perfectly rounded. The corner teeth increase in thickness, and the hooks have become blunt.

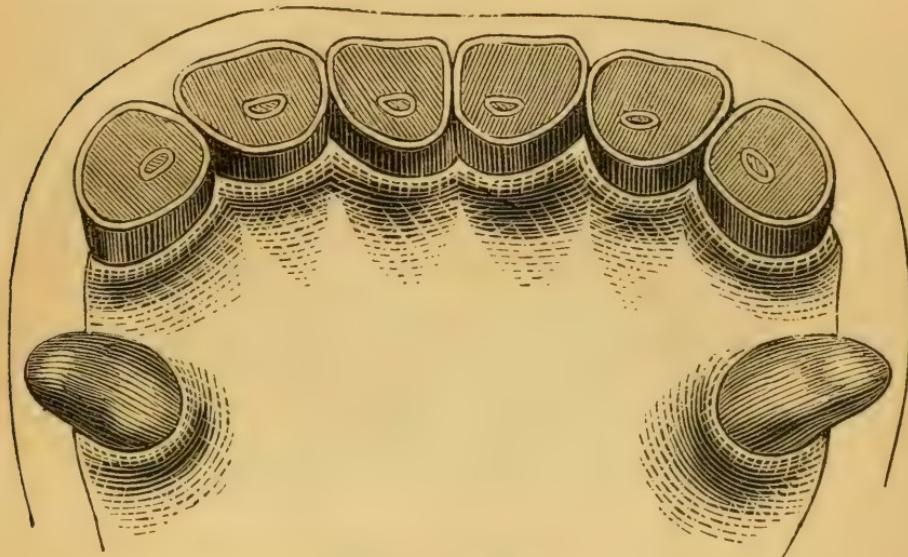


Fig. 25. 14 years.

At 14 years of age the corner tooth of the lower jaw becomes round.

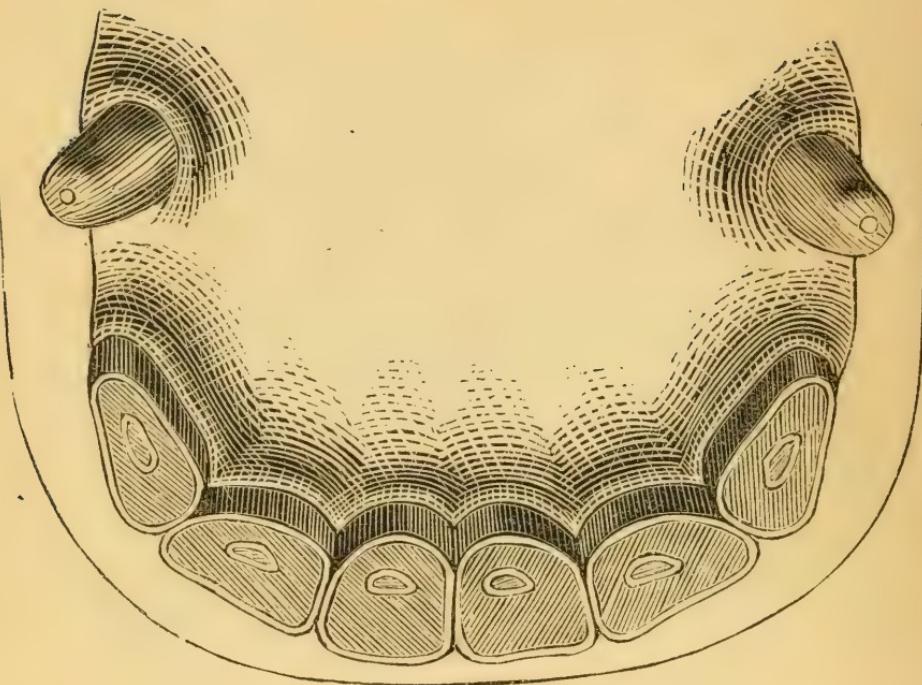


Fig. 26. 15 years.

At 15 years the nippers in the upper jaw are rounded.

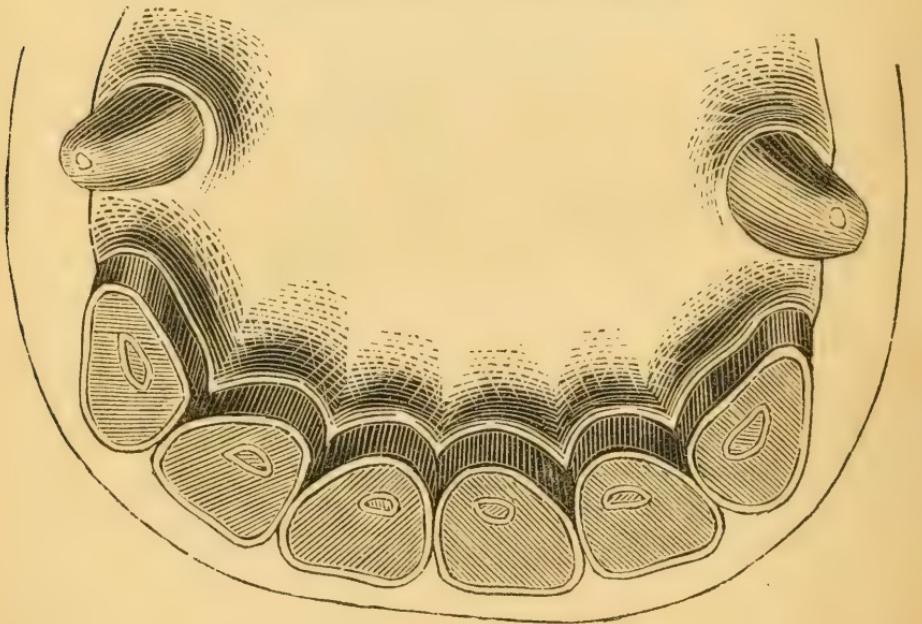


Fig. 27. 16 years.

At 16 years the middle teeth assume the same appearance.

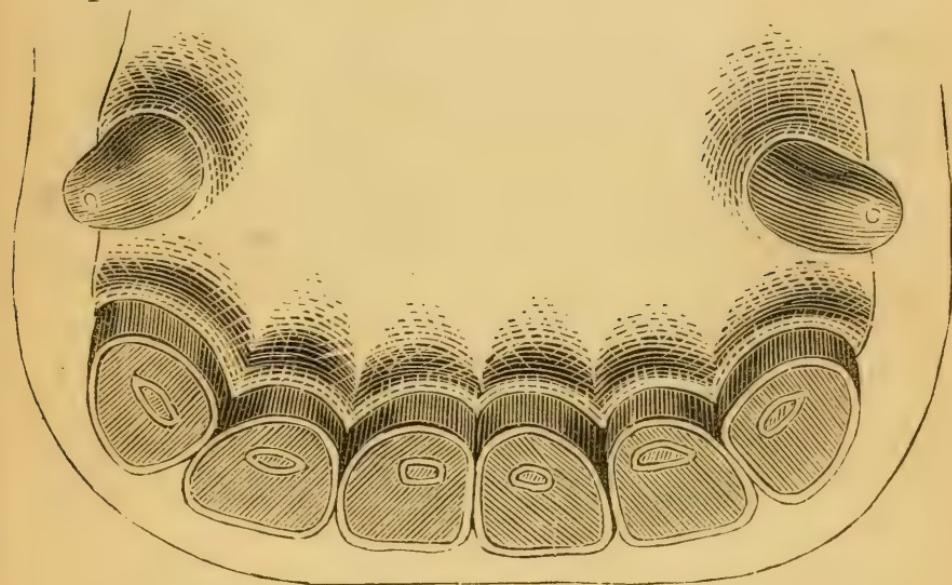


Fig. 28. 17 years.

At 17 years the corner teeth of the upper jaw are also rounded.

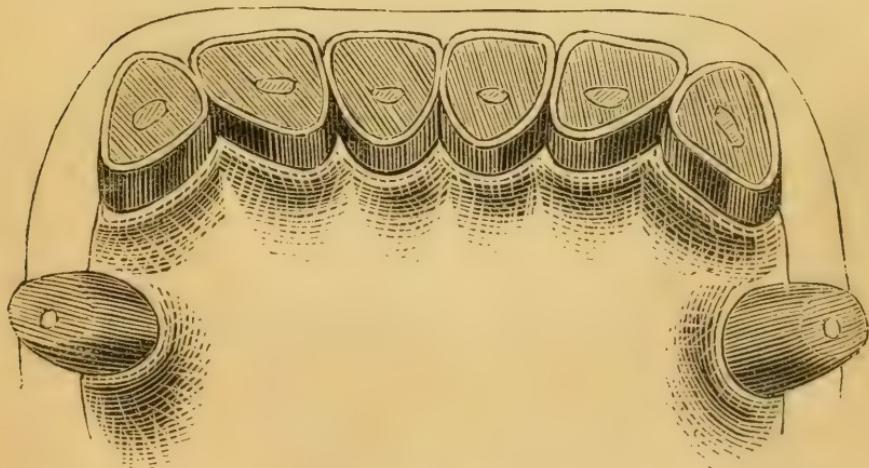


Fig. 29. 18 years.

At 18 years the nippers in the lower jaw are triangular.

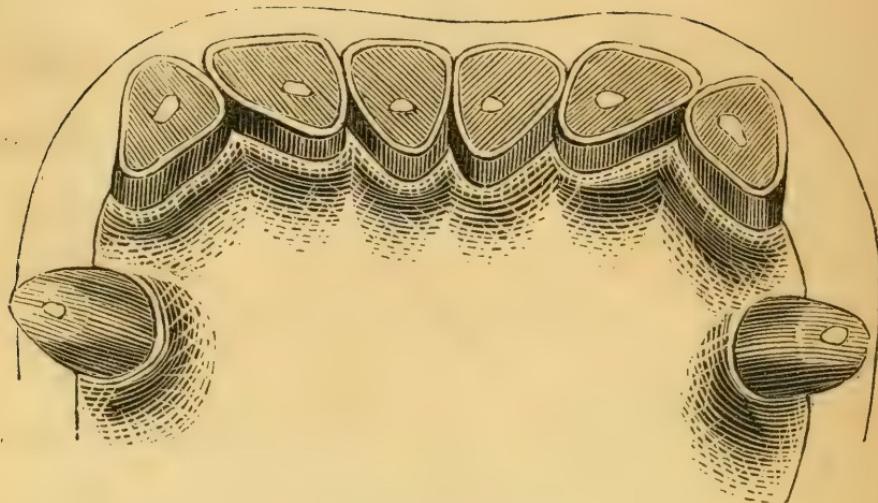


Fig. 30. 19 years.

At 19 years the middle teeth in the lower jaw are triangular.

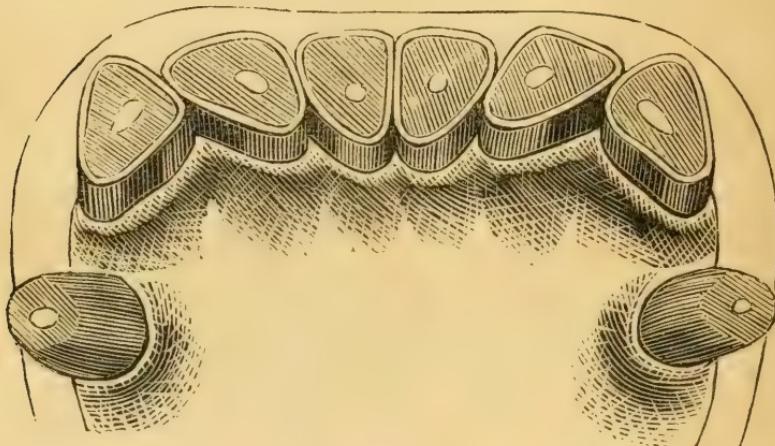


Fig. 31. 20 years.

At 19 years the corner teeth of the lower jaw assume the same form.

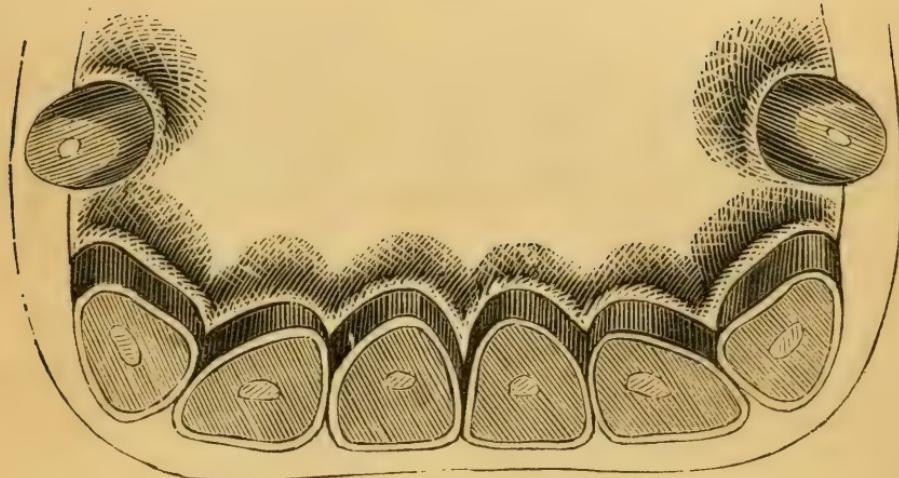


Fig. 32. 21 years.

At 21 years the nippers of the upper jaw have become triangular.

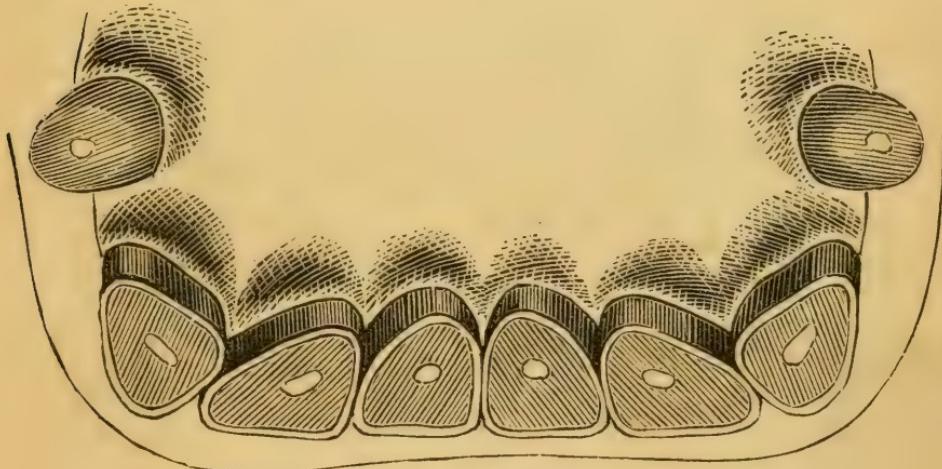


Fig. 33. 22 years.

At 22 years the middle teeth of the upper jaw have the triangular form.

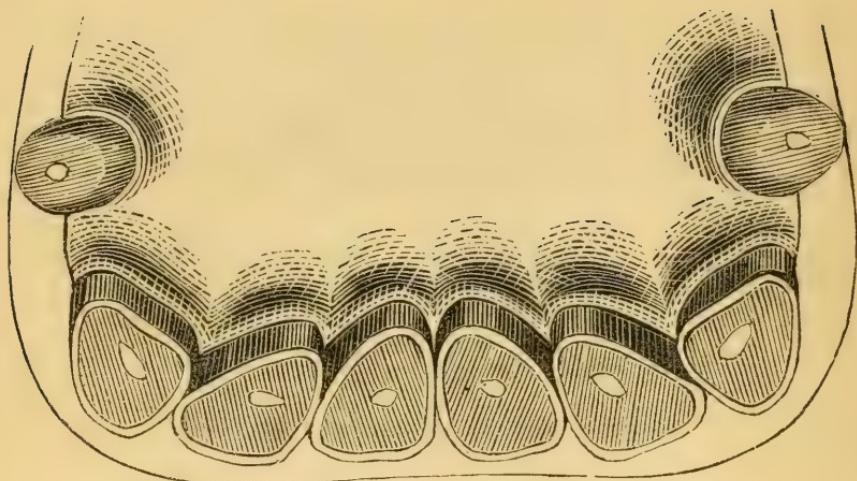


Fig. 34. 23 years.

At 23 years the corner teeth are also triangular.

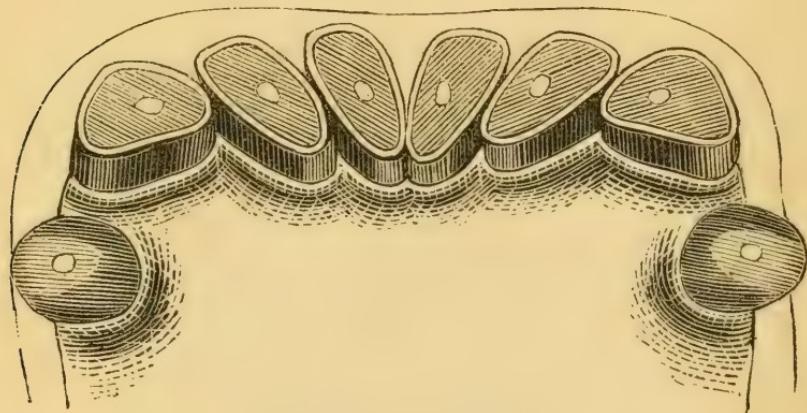


Fig. 35. 24 years.

At 24 years the nippers in the lower jaw have become twice as thick as broad.

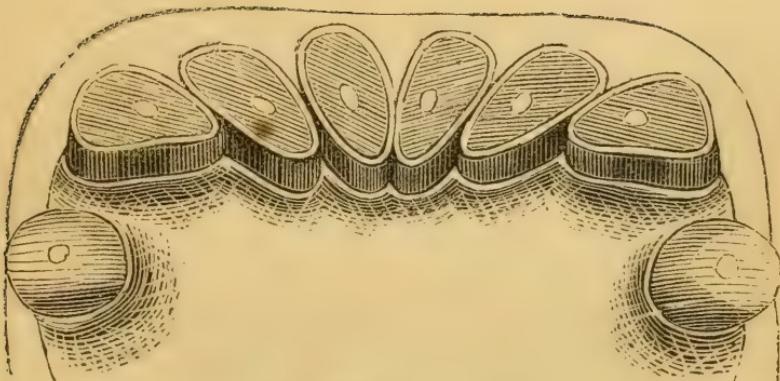


Fig. 36. 25 years.

At 25 years the same is the case with the middle teeth.

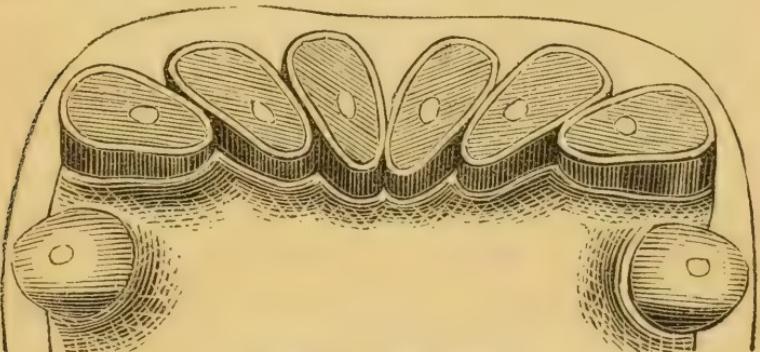


Fig. 37. 26 years.

At 26 years the corner teeth have become twice as thick as broad.

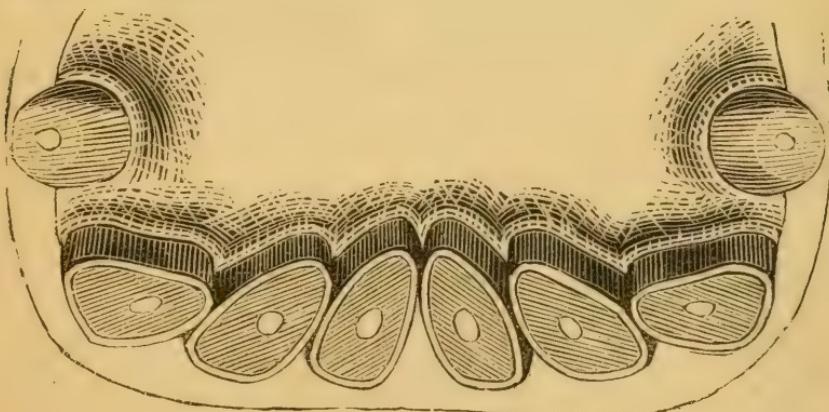


Fig. 38. 27 years

At 27 years the nippers in the upper jaw are twice as thick as broad

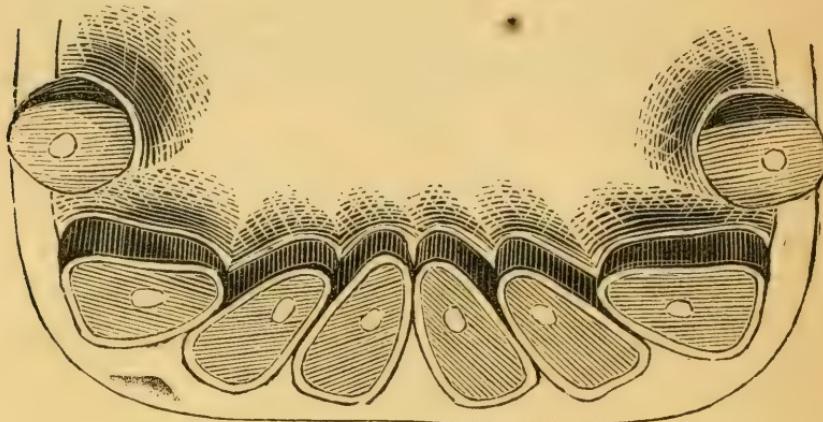


Fig. 39. 28 years.

At 28 years the middle teeth have the same form.

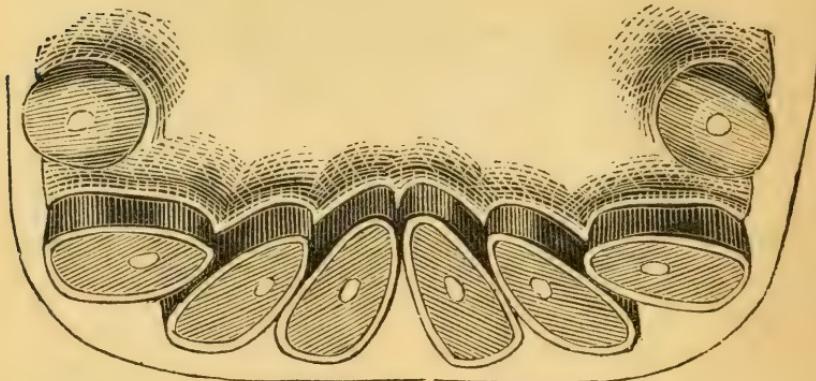


Fig. 40. 29 years.

At 29 years the corner teeth are also twice as thick as broad.

The foregoing plainly shews, that as long as the teeth retain their proper length, there is no difficulty in discerning the exact age of a horse.

We will now prove that the age of those horses which have irregular teeth, can also be ascertained with exactness.

We have seen that the teeth shoot up a line every

year, but cannot wear down in the same degree, when they stand too far forwards in the mouth. In order to discover the exact age of a horse possessing such teeth, it is only necessary to observe the mark narrowly.

For instance, suppose the mark shews 8 years, but the teeth are 4 lines too long for that age; it follows that the horse has lived 12 years

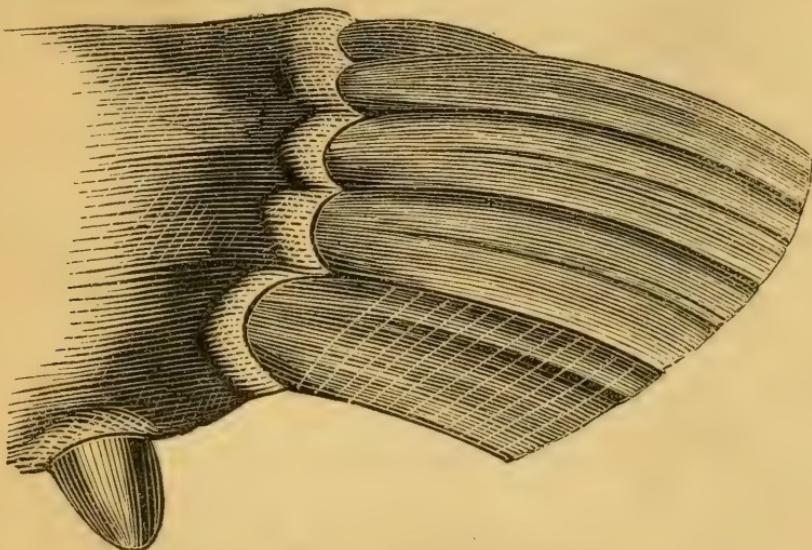


Fig. 41. 20 years.

Shews a tooth which is 12 lines too long, the mark shews 8 years, but as the tooth has shot up a line each year, and has not worn down, one must add the 12 superfluous lines to the 8 years shewn by the mark; we shall thus arrive at the real age of the horse;—20 years.

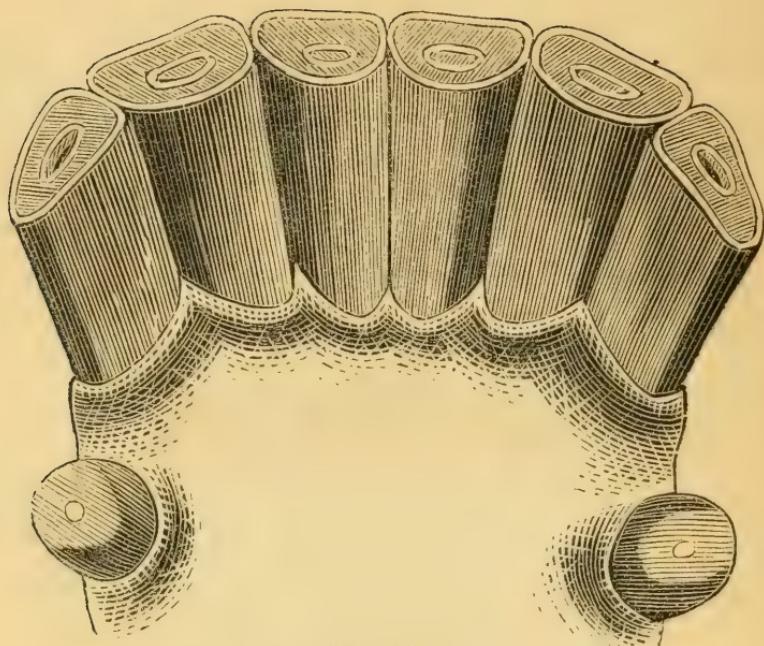


Fig. 42. 20 years

Represents the same lower jaw of 20 years, viewed from inside. The friction surface shews 8 years, and if as in.

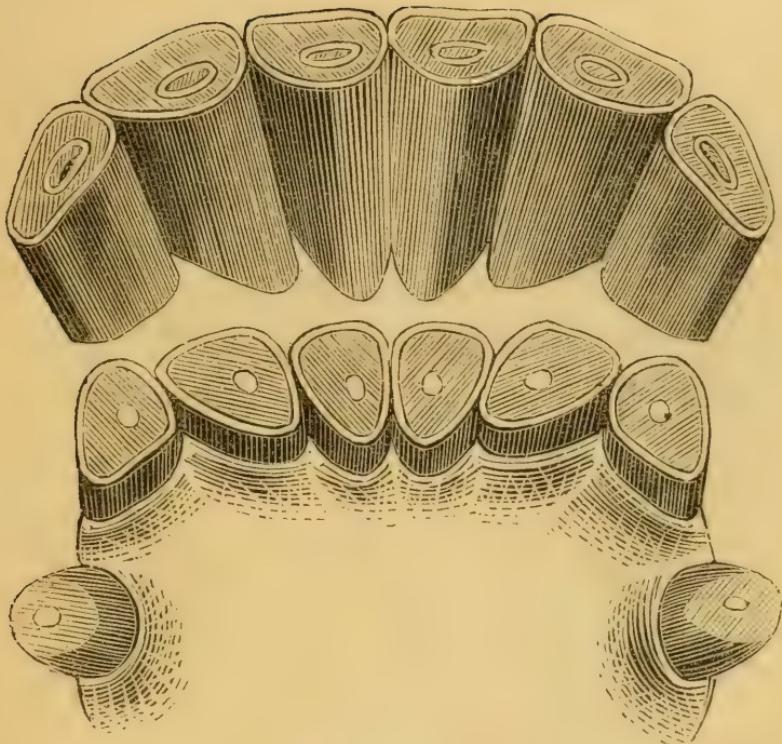


Fig. 43.

The superfluous length be removed, one can see the friction of 20 years.

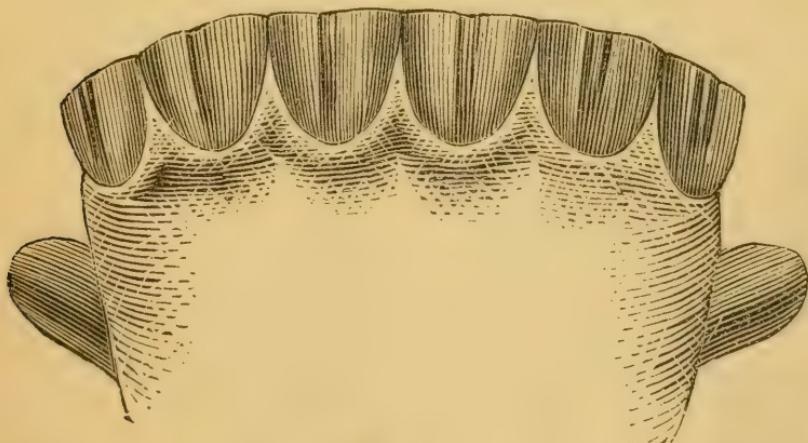


Fig. 44.

Shews the real length, and outside appearance of the teeth in the lower jaw at 20 years of age.

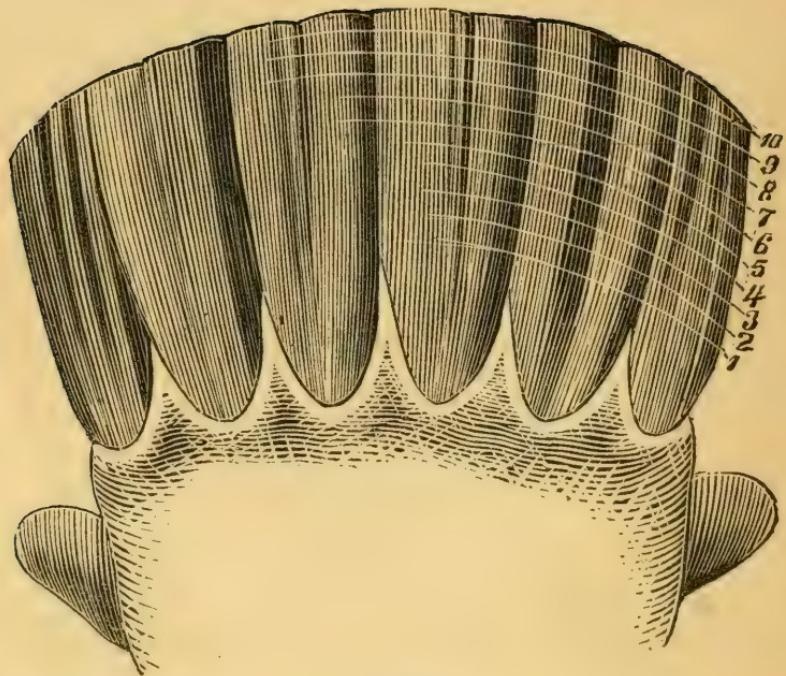


Fig. 45.

Shews a lower jaw in which the teeth are 10 lines too long.

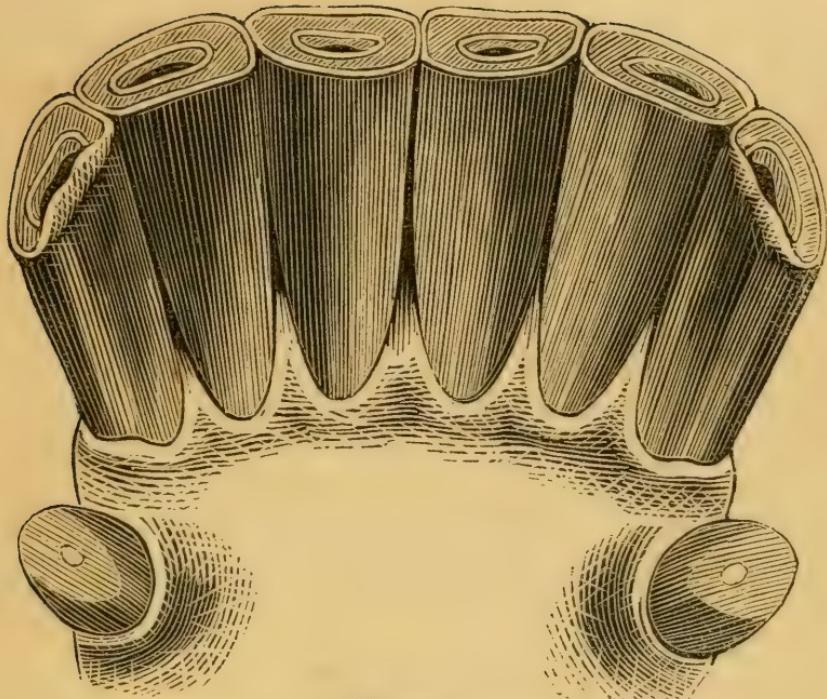


Fig. 46.

An inside view of the same jaw shews a mark of 6 years, the teeth being however 10 lines too long, its age is 16 years.

Large horses have naturally large teeth, which protrude 1 or 2 lines more above the gums than those of smaller ones; this will easily be perceived in young horses of certain breeds. The other signs remain the same. Their age can therefore be ascertained with the same exactness as that of horses of medium size.

Some breeds, the Spanish for instance, require a longer time to develop than the common horses. The bones appear to be harder, the teeth change some-what later, and appear to wear down more slowly; it sometimes happens that such horses after their 5th year, appear 1 and sometimes 2 years younger than they really are, this does not however detract from their value, for these horses are usually very strong, and 1 year more or less in their age, is of no consequence.

In countries where the soil is very rich, and horses grow up very voluptuously, great deceptions are sometimes practised, with young horses. They are made to appear older than they really are, in order, that they may the sooner be brought into market. For this purpose the incisors are generally forcibly knocked out a year sooner than they would change of themselves.

A foal of 2 years old, if wanted for work, is not so valuable as one of 3 years, and one of 3 is not worth so much as one of 4 years. Should deception be suspected however, one can soon convince oneself by a careful scrutiny of the remaining teeth. For instance if the nippers have changed and the inner edges of the corner teeth, as in Fig. 5 have not yet come into contact, it is evident that the foal is but a year old. Thus the trick can easily be discovered.

When the foal teeth are forcibly broken out, the new horse teeth soon force themselves through.

If the reader however has once made himself thoroughly acquainted with the rules we have given, he can detect any intended fraud.

On the other hand there are cheats who strive for their own purposes to make the horses appear younger than they are, by burning in artificial marks, this is however also easy of detection.

Observe Fig. 10 around the mark you will perceive an *enamel*. By examining a nipper of 16 years it will be perceived that the enameled circle of this tooth is so minute, that by burning a mark as large as that in the nipper of a four year old, the entire enamel would be disturbed. Besides the 16 year old tooth is not sufficiently broad to admit of such mark.

There are also crib-biters, which by wearing out their front teeth, appear a few years older than they really are. The age of these can be ascertained however by their corner teeth, which are very seldom injured; should this

be the case however, then as many lines as are wanting to make the teeth the natural length must be deducted; and the horse is as many years younger, as the teeth are lines too short.

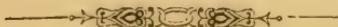
The front teeth are also frequently worn away earlier than usual, when horses have been fed from their youth upon unshelled cornears.

The age of mules cannot be ascertained with the same accuracy as that of horses. After their 8th year they usually appear younger than they are. Their bones are much harder and their length of life frequently double that of the horse.

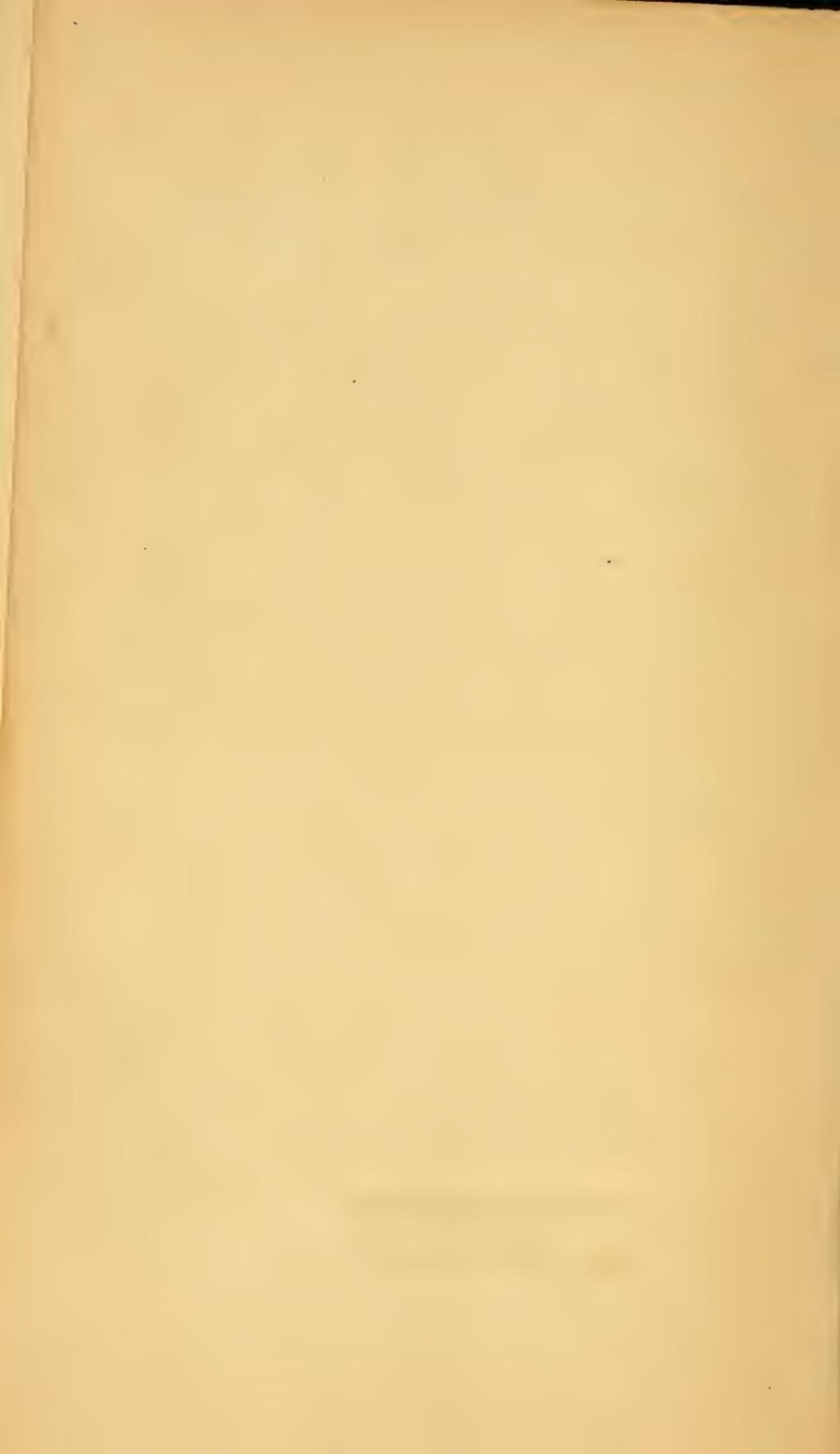
In all the works which have hitherto been published on this subject, the writers have only explained the variations in the teeth, thoroughly, until the 8th year, after which period their descriptions are any thing but clear, in fact evidently guess work.

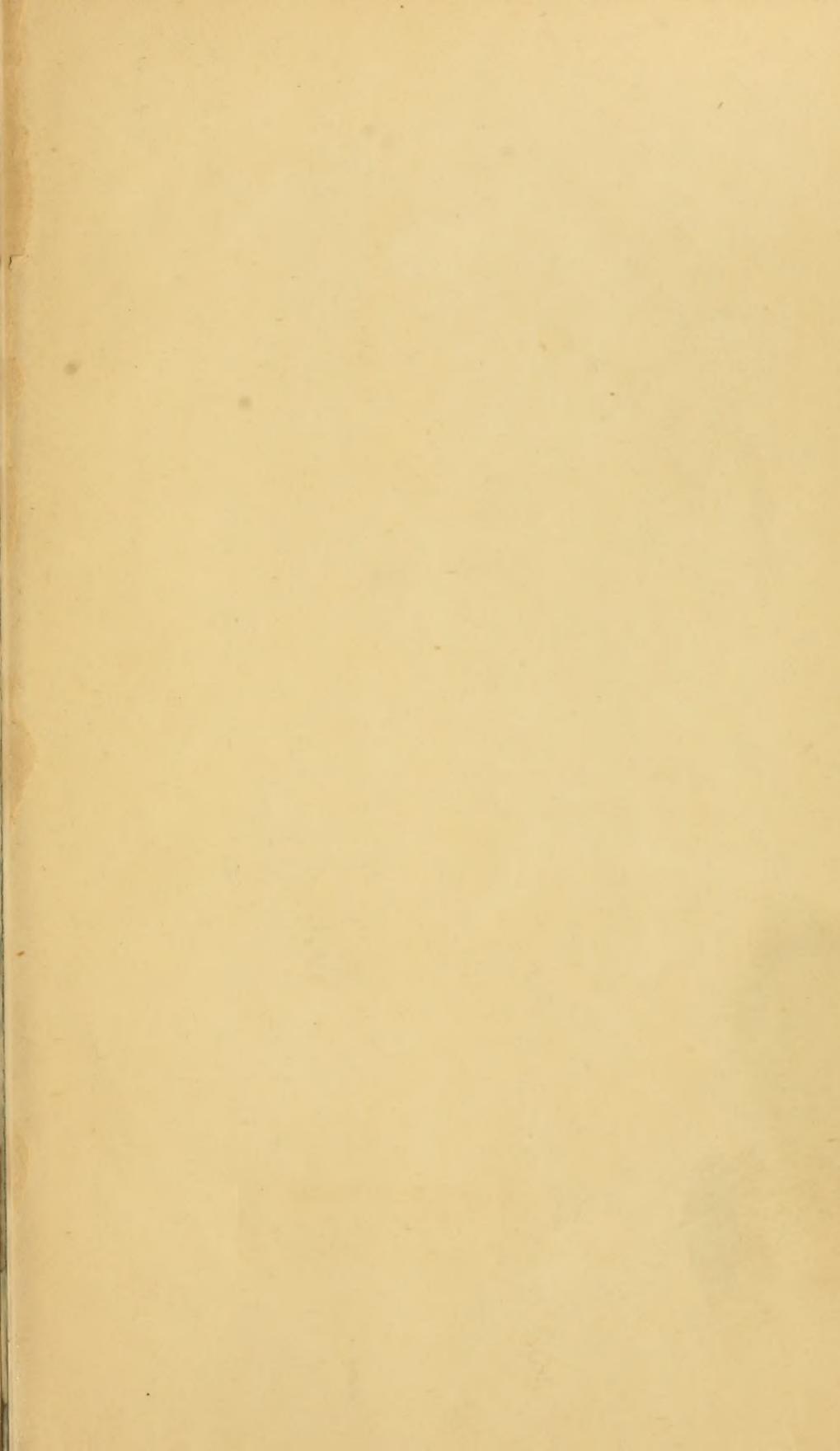
By a thorough knowledge of anatomy and physiology, as well as for years, having attentively examined both living and dead horses, the author has convinced himself, that the age of a horse may be ascertained with the same accuracy after it has attained its 8th year, as before.

Should this work prove a useful guide, to its readers the author will feel himself richly compensated.



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